

Pranab Kumar Sarkar

GENERAL DETAILS



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Assistant Professor

ACADEMIC QUALIFICATION

PhD- NIT Silchar, M.Sc. (Physics)- Assam University, Silchar

Currently Teaching Subject: Engineering Physics (B. Tech. 1st Semester),
 Electromagnetic Theory (B. Tech. ECE 3rd Semester)
 Engineering Mechanics (B. Tech. 2 Semester)
 Electrical Technology (B. Tech. 2 Semester)

EXPERIENCE

Postdoctoral Experience: Jadavpur University, Kolkata (April'2017 to Oct'2017)
Administrative Experience: HOD-in-charge (Since Dec'2017), Warden (Since Dec'2017)

AREAS OF RESEARCH INTEREST

Metal Oxide thin film & Nanostructures, Photosensor, Perovskite Solar Cell, Transition metal oxides and Polymer Nanocomposites for flexible and transparent resistive memory, Semiconductor nanostructure high-k gate dielectric for nano-scaled MOSFETs

AWARDS/ ACHIEVEMENTS

- Graduate aptitude test on engineering (GATE) 2011, Dept. of Higher Education, MHRD, Govt. of India.
 - Qualified SET (Accredited by UGC) for Lectureship conducted by State Level Eligibility test Commission, Assam in 2013.
 - Awarded National Postdoctoral Fellowship (NPDF), SERB, DST (2017) (Not availed)
 - Awarded Postdoctoral Fellowship, UGC Dr D S Kothari (2017).
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PUBLICATIONS IN INTERNATIONAL JOURNALS

- D Das, A Barman, **P. K. Sarkar**, P. Rajput, S. N. Jha, R. Hübner, Kanjilal, P. Johari and A. Kanjilal, Metal-induced progressive alteration of conducting states in memristors for

- implementing an efficient analog memory: a DFT-supported experimental approach, *J. Mater. Chem. C*, 2021, Advance Article, DOI: 10.1039/D0TC04918B
- T Paul, **P K Sarkar**, S Maiti, K K Chattopadhyay, Multilevel Programming and Light-Assisted Resistive Switching in a Halide-Tunable All-Inorganic Perovskite Cube for Flexible Memory Devices, *ACS Appl. Electron. Mater.* **2** (2020) 3667-3677, DOI: 10.1021/acsaelm.0c00719
 - U Das, D Das, B Paul, T Rabha, S Pattanayak, A Kanjilal, S Bhattacharjee, **P K Sarkar**, A Roy, Induced Vacancy-Assisted Filamentary Resistive Switching Device Based on $\text{RbPbI}_{3-x}\text{Cl}_x$ Perovskite for RRAM Application, *ACS Appl. Mater. Interfaces*, **12**, (2020) 41718–41727, DOI: 10.1021/acsaelm.0c10123
 - U Das, A Nyayban, B Paul, A Barman, **P K Sarkar**, A Roy, Compliance Current Dependent Dual-Functional Bipolar and Threshold Resistive Switching in All-Inorganic Rubidium Lead Bromide Perovskite Based Flexible Device, *ACS Appl. Electron. Mater.* **2** (2020) 1343–1351, DOI: 10.1021/acsaelm.0c00130
 - N Besra, K Sardar, S Maiti, **P K Sarkar**, T Paul, S Thakur, G Majumdar, K K Chattopadhyay, Incorporation of V_2O_5 nanorods into perovskite photodetectors as an alternative approach to enhance device performance: a step towards stability against ambient water species, *Dalton Trans* **49** (2020), 15788-15799, DOI: 10.1039/D0DT03177A
 - A Siddik, P K Haldar, P Garu, S Bhattacharjee, U Das, A Barman, A Roy, **P K Sarkar**, Enhancement of data storage capability in a bilayer oxide based memristor for wearable electronic applications, *J. Phys. D: Appl. Phys.* **53** (2020) 295103, DOI: 10.1088/1361-6463/ab81d3
 - U Das, S Bhattacharjee, B Mahato, M Prajapat, **P K Sarkar**, A Roy, Uniform, large-scale growth of WS_2 nanodomains via CVD technique for stable non-volatile RRAM application, *Mater Sci Semicond Process* **107** (2019) 104837, DOI: 10.1016/j.mssp.2019.104837
 - U Das, S Bhattacharjee, **P K Sarkar**, A Roy, A multi-level bipolar memristive device based on visible light sensing MoS_2 thin film, *Mater. Res. Express*, **6** (2019) 075037, DOI: 10.1088/2053-1591/ab154d
 - B Das, **P K Sarkar**, N S Das, S Sarkar, K, K Chattopadhyay, Flexible, transparent resistive switching device based on topological insulator Bi_2Se_3 -organic composite, *J of Appl. Phys.*, **124**, (2018) 124503, DOI: 10.1063/1.5042332
 - S Bhattacharjee, U Das, **P Sarkar**, A Roy, Stable charge retention in graphene- MoS_2 assemblies for resistive switching effect in ultra-thin super-flexible organic memory devices, *Organic Electronics*, **58** (2018) 145–152, DOI: 10.1016/j.orgel.2018.03.039
 - A Barman, C P Saini, **P K Sarkar**, G Bhattacharjee, G Bhattacharya, S Srivastava, B Satpati, D Kanjilal, S K Ghosh, S Dhar and A Kanjilal, Resistive Switching behavior in oxygen ion irradiated TiO_{2-x} films, *J. Phys. D: Appl. Phys.* **51** (2018) 065306 DOI: 10.1088/1361-6463/aaa559
 - A. Barman, C. P. Saini, **P. K. Sarkar**, D. Das, S. Dhar, M. Singh, A. K. Sinha, D. Kanjilal, M. Gupta, D. M. Phase, and A. Kanjilal, Nanoscale self-recovery of resistive switching in Ar^+ irradiated TiO_{2-x} films, *J. Phys. D: Appl. Phys.* **50**, (2017) 475304. DOI: 10.1088/1361-6463/aa9013.
 - S. Bhattacharjee, **P K Sarkar**, M Prajapat, A Roy, Electrical Reliability, Multilevel Data Storage and Mechanical Stability of MoS_2 -PMMA Nanocomposite Based Non-volatile

- Memory Device, *J. Phys. D: Appl. Phys.* **50**, (2017) 265103. DOI: 10.1088/1361-6463/aa71e9
- S Bhattacharjee, **P K Sarkar** and A Roy, Polyvinyl-alcohol based devices with highly conductive, optically active boron-doped ZnO nanoparticles for efficient resistive-switching at ultralow operating voltage, *Superlattices and Microstructures* **100**, (2016) 1057–1063. DOI: 10.1016/j.spmi.2016.10.075.
 - **P K Sarkar**, S Bhattacharjee, A Barman, A Kanjilal and A Roy, Multilevel Programming in Cu/NiO_y/NiO_x/Pt Unipolar Resistive Switching Devices, *Nanotechnology* **27**, (2016) 435701. DOI:10.1088/0957-4484/27/43/435701.
 - A. Barman, C.P. Saini, **P K Sarkar**, A. Roy, B. Satpati, D. Kanjilal, S. K. Ghosh, S. Dhar, and A. Kanjilal, Probing electron density across Ar⁺ irradiation-induced self-organized TiO_{2-x} nanochannels for memory application, *Appl. Phys. Letts.* **108**, (2016) 244104. DOI: 10.1063/1.4954166.
 - S. Bhattacharjee, **P K Sarkar**, N. Roy and A. Roy, Improvement of Reliability of Polymer Nanocomposite Based Transparent Memory Device by Oxygen Vacancy Rich ZnO Nanorods, *Microelectron. Eng.* **164**, (2016) 53–58. DOI:10.1016/j.mee.2016.04.027
 - **P K Sarkar**, M. Prajapat, A. Barman, S. Bhattacharjee and A. Roy, Multilevel resistance state of Cu/La₂O₃/Pt forming-free switching devices, *J. Mater. Sci.* **51**, (2016) 4411-4418. DOI 10.1007/s10853-016-9753-6.
 - A. Barman, C. P. Saini, **P K Sarkar**, B. Satpati, S. R. Bhattacharyya, D. Kabiraj, D. Kanjilal, S. Dhar, and A. Kanjilal, Self-organized titanium oxide nano-channels for resistive memory application, *J. Appl. Phys.* **118** (2015) 224903. DOI: 10.1063/1.4936961.
 - **P K Sarkar** S. Bhattacharjee, M. Prajapat and A. Roy, Incorporation of SnO₂ nanoparticles in PMMA for performance enhancement of a transparent organic resistive memory device, *RSC Adv.* **5** (2015) 105661–105667. DOI: 10.1039/c5ra15581a.
 - **P K Sarkar** and A. Roy, Improvement of retentivity in TiO_x/HfO_x bilayer structure for low power resistive switching memory applications, *Surf. Rev. Lett.* **22** (2015)1550031. DOI: 10.1142/S0218625X15500316
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CONFERENCE PUBLICATIONS

- U Das, T Rabha, A Dehingia, S Bhattacharjee, **P K Sarkar**, and A Roy Enhanced photoluminescence in chloride doped all-inorganic rubidium lead iodide perovskite, *AIP Conference Proceedings* **2265** (2020) 030175, DOI: 10.1063/5.0018471
- U Das, B Mahato, A Mahapatra, **P K Sarkar**, and A Roy, Bipolar resistive switching behaviour of WS₂ thin films grown by chemical vapour deposition, *AIP Conference Proceedings* **2115**, (2019) 030274 DOI: 10.1063/1.5113113
- U Das, B Mahato, A Mahapatra, **P K Sarkar**, and A Roy, Multilevel Conductance State in Chemical Vapor Deposited WS₂ Based Resistive Memory Device, *AIP Conference Proceedings* **2100**, (2019) 020052, DOI: 10.1063/1.5098606
- T. Paul, B.K. Chatterjee, S. Maiti, N. Besra, S. Thakur, S. Sarkar, K.Chanda, A. Das, **P.K. Sarkar**, K. Sardar and K.K. Chattopadhyay, Luminescence Behaviour of Room Temperature Chemical Processed All-Inorganic CsPbCl₃ Perovskite Cubes, *AIP Conference Proceedings* **1953**, (2018) 030085. DOI: 10.1063/1.5032420.
- N. Besra, T. Paul, **P. K. Sarkar**, S. Thakur, S. Sarkar, A. Das, K. Chanda, K.Sardar and K. K. Chattopadhyay, Room Temperature Solution Processed Low Dimensional CH₃NH₃PbI₃ NIR Detector, *AIP Conference Proceedings* **1953**, (2018) 030210. DOI: 10.1063/1.5032545

- **P K Sarkar** and A. Roy, Enhanced resistive switching phenomena using Al/Ti/TiO_x/HfO_x/Pt bilayer structure, *AIP Conference Proceedings* **1665**, (2015) 080061.
- **P K Sarkar** and A. Roy, Electrical properties of radio-frequency sputtered HfO₂ thin films for advanced CMOS technology, *AIP Conference Proceedings* **1675**, (2015) 030066.
- A. Barman, C. P. Saini, **P K Sarkar**, B. Satpati, S. R. Bhattacharyya, D. Kabiraj, D. Kanjilal, S. Dhar and A. Kanjilal, Resistive switching in self-organized TiO₂ nano-channels for resistive random access memory, *Conference Proceedings NBL-2016*, IUCA Delhi. DOI: 10.3850/978-981-09-7519-7nbl16-rps-118.
- **P K Sarkar**, A. Barman, A. Kanjilal, M. Nath & A. Roy, Conductive-AFM Investigation for Resistive Switching Characteristic in NiO Thin Film Grown by Pulsed Electron Deposition, IWPSD 2015, IISc, Bangalore.
- S. Bhattacharjee, **P K Sarkar** and A. Roy The electrical bistable behaviour of inorganic nanoparticles embedded polymer films, ICFMST – 2015, NIST, Odisha.
- S. Bhattacharjee, **P K Sarkar**, M. Nath and A. Roy, Effect of Boron concentration in the electrical bistable behaviour of inorganic nanoparticles embedded polymer films, IWPSD 2015, IISc Bangalore.
- M. Nath, **P K Sarkar** and A. Roy, Interfacial and electrical properties of radio frequency sputtered ultra-thin HfO₂ film for gate oxide applications, IWPSD 2015, IISc Bangalore.
- A. Barman, C. P. Saini, **P K Sarkar**, B. Satpati, S. R. Bhattacharyya, S. Dhar, D. Kanjilal, S. K. Ghosh and A. Kanjilal, Short range monocrystalline TiO₂ layers for non-volatile memory devices, IWPSD 2015, IISc Bangalore.